



## How much land-based greenhouse gas mitigation can be achieved without compromising food security and environmental goals?

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### Abstract:

Feeding 9-10 billion people by 2050 and preventing dangerous climate change are two of the greatest challenges facing humanity. Both challenges must be met while reducing the impact of land management on ecosystem services that deliver vital goods and services, and support human health and well-being. Few studies to date have considered the interactions between these challenges. In this study we briefly outline the challenges, review the supply- and demand-side climate mitigation potential available in the Agriculture, Forestry and Other Land Use AFOLU sector and options for delivering food security. We briefly outline some of the synergies and trade-offs afforded by mitigation practices, before presenting an assessment of the mitigation potential possible in the AFOLU sector under possible future scenarios in which demand-side measures codeliver to aid food security. We conclude that while supply-side mitigation measures, such as changes in land management, might either enhance or negatively impact food security, demand-side mitigation measures, such as reduced waste or demand for livestock products, should benefit both food security and greenhouse gas (GHG) mitigation. Demand-side measures offer a greater potential (1.5-15.6 Gt CO<sub>2</sub> -eq. yr<sup>-1</sup>) in meeting both challenges than do supply-side measures (1.5-4.3 Gt CO<sub>2</sub> -eq. yr<sup>-1</sup>) at carbon prices between 20 and 100 US\$ tCO<sub>2</sub> -eq. yr<sup>-1</sup>, but given the enormity of challenges, all options need to be considered. Supply-side measures should be implemented immediately, focussing on those that allow the production of more agricultural product per unit of input. For demand-side measures, given the difficulties in their implementation and lag in their effectiveness, policy should be introduced quickly, and should aim to codeliver to other policy agenda, such as improving environmental quality or improving dietary health. These problems facing humanity in the 21st Century are extremely challenging, and policy that addresses multiple objectives is required now more than ever.

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### Resource Description

#### Exposure : ☒

weather or climate related pathway by which climate change affects health

Food/Water Security

# Climate Change and Human Health Literature Portal

**Food/Water Security:** Agricultural Productivity, Livestock Productivity

**Geographic Feature:** ☒

resource focuses on specific type of geography

None or Unspecified

**Geographic Location:** ☒

resource focuses on specific location

Global or Unspecified

**Health Impact:** ☒

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

**Mitigation/Adaptation:** ☒

mitigation or adaptation strategy is a focus of resource

Mitigation

**Model/Methodology:** ☒

type of model used or methodology development is a focus of resource

Cost/Economic, Methodology

**Resource Type:** ☒

format or standard characteristic of resource

Review

**Timescale:** ☒

time period studied

Time Scale Unspecified